

WHAT IS CLAIMED:

1. A purified DNA molecule encoding HG51 which comprises the nucleotide sequence:

GGGGCCACGG GGGGTGCGCC GGCGCGCGGT AGCGCGGGCC CCTCAGTGCA CAATGGCCAG
 5 AGCAGGCGGC GGAGCCCCAG CCCCACCCAG TGCGGAGCGC GCCGCGAGCC CCGCCGCAAG
 CTGAGCGCCT CGGCCGCCA GGCGCGCCGG CGCCGGGCCA TGTACTCGGG GAACCGCAGC
 GGCAGGCCACG GCTACTGGGA CGGCAGGGGG GCGCGGGGCC CTGAGGGGCC GGCAGCCGGCG
 GGGACACTGA GCCCGCGCC CCTCTTCAGC CCCGGCACCT ACGAGCCCT GGCAGCTGCTG
 CTGGGCTCCA TTGGGCTGCT GGGCGTCGGC AACAAACCTGC TGGTGCCTCGT CCTCTACTAC
 10 AAGTTCCAGC GGCTCCGCAC TCCCACCTCAC CTCCCTCTGG TCAACATCAG CCTCAGCGAC
 CTGCTGGTGT CCCTCTTCGG GGTACACCTTT ACCTTCGTGT CCTGCCTGAG GAACGGCTGG
 GTGTGGGACA CGTGGGCTG CGTGTGGGAC GGGTTTAGCG GCAGCCTCTT CGGGATTGTT
 TCCATTGCCA CCCTAACCGT GCTGGCCTAT GAACGTTACA TTCGCGTGGT CCATGCCAGA
 GTGATCAATT TTTCCTGGC CTGGAGGGCC ATTACCTACA TCTGGCTCTA CTCACTGGCG
 15 TGGGCAGGAG CACCTCTCCT GGGATGGAAC AGGTACATCC TGGACGTACA CGGACTAGGC
 TGCACTGTGG ACTGGAAATC CAAGGATGCC AACGATTCCCT CCTTTGTGCT TTTCTTATTT
 CTTGGCTGCC TGGTGGTGCC CCTGGGTGTC ATAGCCCATT GCTATGCCA TATTCTATAT
 TCCATTGAA TGCTTCGTTG TGTGGAAGAT CTTCAGACAA TTCAAGTGAT CAAGATTTA
 AAATATGAAA AGAAACTGGC CAAAATGTGC TTTTTAATGA TATTCACCTT CCTGGTCTGT
 20 TGGATGCCTT ATATCGTGTAT CTGCTTCTTG GTGGTTAATG GTCATGGTCA CCTGGTCACT
 CCAACAATAT CTATTGTTTC GTACCTCTTT GCTAAATCGA AACTGTATA CAATCCAGTG
 ATTTATGTCT TCATGATCAG AAAGTTCGA AGATCCCTT TGCAAGCTCT GTGCCTCCGA
 CTGCTGAGGT GCCAGAGGCC TGCTAAAGAC CTACCAAGCAG CTGGAAGTGA AATGCAGATC
 AGACCCATTG TGATGTCACA GAAAGATGGG GACAGGCCAA AGAAAAAAAGT GACTTTCAAC
 25 TCTTCTTCCA TCATTTTAT CATCACCAAGT GATGAATCAC TGTCAGTTGA CGACAGCGAC
 AAAACCAATG GGTCCAAAGT TGATGTAATC CAAGTTCGTC CTTTGTAGGA ATGAAGAAATG
 GCAACGAAAG ATGGGGCCTT AAATTGGATG CCACCTTTGG ACTTTCATCA TAAGAAGTGT
 CTGGAATACC CGTTCTATGT AATATCAACA GAACCTTGTG GTCCAGCAGG AAATCCGAAT
 TGCCCATATG CTCTTGGGCC TCAGGAAGAG GTTGAAC , disclosed herein as SEQ ID
 30 NO:1.

2. A purified DNA molecule encoding human HG51 wherein said DNA molecule encodes a protein comprising the amino acid sequence:

MYSGNRSGGH GYWDGGGAAG AEGPAPAGTl SPAPLFSPGT YERLALLLGs IGLLGVGNNL
LVLVLYYKFQ RLRTPTHLLL VNISLSDLLV SLFGVTFTFV SCLRNGWVWD TVGCVWDGFS
GSLFGIVSIA TLTIVLAYERY IRVVHARVIN FSWAWRAITY IWLYSLAWAG APLLGWNRYI
LDVHGLGCTV DWKSKDANDS SFVLFLFLGC LVVPLGVIAH CYGHILYSIR MLRCVEDLQT
5 IQVIKILKYE KKLAKMCFLM IFTFLVCWMP YIVICFLVNN GHGHLVTPTI SIVSYLFAKS
NTVYNPVIYV FMIRKFRRLSL LQLLCLRLLR CQRAKDLPA AGSEMQRPI VMSQKDGRP
KKKVTFNSSS IIFIITSDES LSVDDSDKTN GSKVDVIQVR PL , which is disclosed herein
in the three letter amino acid code as set forth in SEQ ID NO:2.

10 3. An expression vector for the expression of a HG51 protein in a recombinant host cell wherein said expression vector comprises a DNA molecule which encodes the amino acid sequence of claim 2.

15 4. An expression vector of claim 3 which is a eukaryotic expression vector.

5. An expression vector of claim 3 which is a prokaryotic expression vector.

20 6. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 3.

7. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 4.

25 8. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 5.

9. A subcellular membrane fraction obtained from the host cell of claim 6 which contains recombinant HG51.

30 10. A subcellular membrane fraction obtained from the host cell of claim 7 which contains recombinant HG51.

11. A subcellular membrane fraction obtained from the host cell of claim 8 which contains recombinant HG51.

12. A purified DNA molecule encoding HG51 which consists of 5 the nucleotide sequence:

GGGGCCACGG GGGGTGCGCC GGCGCGCGGT AGCGCGGGCC CCTCAGTGCA CAATGGCCAG
 AGCAGGCGGC GGAGCCCCAG CCCCACCCAG TGCGGAGCGC GCCGCGAGCC CCGCCGCAAG
 CTGAGCGCCT CCGCCCGCCA GGCGCGCCGG CGCCGGGCCA TGTACTCGGG GAACCGCAGC
 GGCGGCCACG GCTACTGGGA CGGCGGGCGG GCCCGGGCG CTGAGGGGCC GGCGCCGGCG
 10 GGGACACTGA GCCCCCGGCC CCTCTTCAGC CCCGGCACCT ACGAGGCCCT GGCGCTGCTG
 CTGGGCTCCA TTGGGCTGCT GGGCGTCGGC AACAAACCTGC TGGTGCCTCGT CCTCTACTAC
 AAGTTCCAGC GGCTCCGCAC TCCCACTCAC CTCCTCCTGG TCAACATCAG CCTCAGCGAC
 CTGCTGGTGT CCCTCTTCGG GGTACACCTTT ACCTTCGTGT CCTGCCTGAG GAACGGCTGG
 GTGTGGGACA CGTGGGCTG CGTGTGGGAC GGGTTAGCG GCAGCCTCTT CGGGATTGTT
 15 TCCATTGCCA CCCTAACCGT GCTGGCCTAT GAACGTTACA TTCGCGTGGT CCATGCCAGA
 GTGATCAATT TTTCTGGGC CTGGAGGGCC ATTACCTACA TCTGGCTCTA CTCACTGGCG
 TGGGCAGGAG CACCTCTCCT GGGATGGAAC AGGTACATCC TGGACGTACA CGGACTAGGC
 TGCACTGTGG ACTGGAAATC CAAGGATGCC AACGATTCCCT CCTTTGTGCT TTTCTTATTT
 CTTGGCTGCC TGGTGGTGCC CCTGGGTGTC ATAGCCCATT GCTATGCCA TATTCTATAT
 20 TCCATTGCAA TGCTTCGTTG TGTGGAAGAT CTTCAGACAA TTCAAGTGAT CAAGATTTA
 AAATATGAAA AGAAACTGGC CAAAATGTGC TTTTTAATGA TATTCAACCTT CCTGGTCTGT
 TGGATGCCTT ATATCGTGT CTGCTTCTTG GTGGTTAATG GTCATGGTCA CCTGGTCACT
 CCAACAATAT CTATTGTTTC GTACCTCTTT GCTAAATCGA AACTGTATA CAATCCAGTG
 ATTTATGTCT TCATGATCAG AAAGTTTCGA AGATCCCATT TGCAGCTTCT GTGCCTCCGA
 25 CTGCTGAGGT GCCAGAGGCC TGCTAAAGAC CTACCAGCAG CTGGAAGTGA AATGCAGATC
 AGACCCATTG TGATGTCACA GAAAGATGGG GACAGGCCAA AGAAAAAAAGT GACTTTCAAC
 TCTTCTTCCA TCATTTTAT CATCACCAGT GATGAATCAC TGTCAGTTGA CGACAGCGAC
 AAAACCAATG GGTCCAAAGT TGATGTAATC CAAGTTCGTC CTTTGTAGGA ATGAAGAATG
 GCAACGAAAG ATGGGGCCTT AAATTGGATG CCACCTTTGG ACTTTCATCA TAAGAAGTGT
 30 CTGGAATACC CGTTCTATGT AATATCAACA GAACTTGTG GTCCAGCAGG AAATCCGAAT
 TGCCCATATG CTCTTGGGCC TCAGGAAGAG GTTGAAC , disclosed herein as SEQ ID
 NO:1.

13. The purified DNA molecule of claim 12 which consists of a nucleotide sequence from nucleotide 160 to nucleotide 1368 of SEQ ID NO:1.

14. An expression vector for the expression of a HG51 protein in a recombinant host cell wherein said expression vector comprises a DNA molecule of claim 13.

15. An expression vector of claim 14 which is a eukaryotic expression vector.

10 16. An expression vector of claim 14 which is a prokaryotic expression vector.

17. A host cell which expresses a recombinant HG51 protein
15 wherein said host cell contains the expression vector of claim 14.

18. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 15.

20 19. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 16.

25 20. A subcellular membrane fraction obtained from the host cell of claim 17 which contains recombinant HG51 protein.

21. A subcellular membrane fraction obtained from the host cell of claim 18 which contains recombinant HG51 protein.

22. A subcellular membrane fraction obtained from the host cell of
30 claim 19 which contains recombinant HG51 protein.

23. A purified HG51 protein which comprises the amino acid sequence:

MYSGNRSGGH GYWDGGGAAG AEGPAPAGTl SPAPLFSPGT YERLALLLGS IGLLGVGNNL
LVLVLYYKFQ RLRTPTHLLL VNISLSDLLV SLFGVTFTFV SCLRNGWVWD TVGCVWDGFS
GSLFGIVSIA TLTVLAYERY IRVVHARVIN FSWAWRAITY IWLYSLAWAG APLLGWNRYI
LDVHGLGCTV DWKSKDANDS SFVLFLFLGC LVVPLGVIAH CYGHILYSIR MLRCVEDLQT
5 IQVIKILKYE KKLAKMCFLM IFTFLVCWMP YIVICFLVVN GHGHLVTPTI SIVSYLFAKS
NTVYNPVIYV FMIRKFRRSL LQLLCLRLLR CQRPAKDLPA AGSEMQIRPI VMSQKDGDRC
KKKVTFNSSS IIFIITSDES LSVDDSDKTN GSKVDVIQVR PL , which is disclosed
herein in the three letter amino acid code as set forth in SEQ ID NO:2.

10 24. The purified HG51 protein of claim 23 which consists of the
amino acid sequence as set forth in SEQ ID NO:2.

25. A method of identifying a substance which modulates HG51
receptor activity, comprising:

15 (a) combining a test substance in the presence and absence of a
HG51 receptor protein wherein said HG51 receptor protein comprises the amino acid
sequence as set forth in SEQ ID NO:2; and,
(b) measuring and comparing the effect of the test substance in the
presence and absence of the HG51 receptor protein.

20 26. A method for determining whether a substance is a potential
agonist or antagonist of HG51 comprising:

25 (a) transfecting or transforming cells with an expression vector of
claim 3 that directs expression of HG51 in the cells, resulting in test cells;
(b) allowing the test cells to grow for a time sufficient to allow
HG51 to be expressed;
(c) exposing the cells to a labeled ligand of HG51 in the presence
and in the absence of the substance;
(d) measuring the binding of the labeled ligand to HG51; where if
30 the amount of binding of the labeled ligand is less in the presence of the substance
than in the absence of the substance, then the substance is a potential agonist or
antagonist of HG51.

27. A method for determining whether a substance is capable of binding to HG51 comprising:

- (a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;
- 5 (b) exposing the test cells to the substance;
- (c) measuring the amount of binding of the substance to HG51;
- (d) comparing the amount of binding of the substance to HG51 in the test cells with the amount of binding of the substance to control cells that have not been transfected with HG51;
- 10 wherein if the amount of binding of the substance is greater in the test cells as compared to the control cells, the substance is capable of binding to HG51.

28. A method for determining whether a substance is capable of binding to HG51 comprising:

- 15 (a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;
- (b) preparing membranes containing HG51 from the test cells and exposing the membranes to a ligand of HG51 under conditions such that the ligand binds to the HG51 in the membranes;
- 20 (c) subsequently or concurrently to step (b), exposing the membranes from the test cells to a substance;
- (d) measuring the amount of binding of the ligand to the HG51 in the membranes in the presence and the absence of the substance;
- (e) comparing the amount of binding of the ligand to HG51 in the membranes in the presence and the absence of the substance where a decrease in the amount of binding of the ligand to HG51 in the membranes in the presence of the substance indicates that the substance is capable of binding to HG51.

29. A method for determining whether a substance is capable of binding to HG51 comprising:

- (a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;
- (b) preparing membranes containing HG51 from the test cells and exposing the membranes from the test cells to the substance;

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(c) measuring the amount of binding of the substance to the HG51 in the membranes from the test cells;

(d) comparing the amount of binding of the substance to HG51 in the membranes from the test cells with the amount of binding of the substance to membranes from control cells that have not been transfected with HG51, where if the amount of binding of the substance to HG51 in the membranes from the test cells is greater than the amount of binding of the substance to the membranes from the control cells, then the substance is capable of binding to HG51.

10 30. A method of identifying agonists of HG51 comprising:

(a) transfecting or transforming cells with a first expression vector of claim 3 which directs expression of HG51 and a second expression vector which directs the expression of a promiscuous G-protein, resulting in test cells;

15 (b) exposing the test cells to a substance that is a suspected agonist of HG51;

(c) measuring the level of inositol phosphates in the cells; where an increase in the level of inositol phosphates in the cells as compared to the level of inositol phosphates in the cells in the absence of the suspected agonist indicates that the substance is an agonist of HG51.

20 31. A method of identifying antagonists of HG51 comprising:

(a) transfecting or transforming cells with a first expression vector of claim 3 which directs expression of HG51 and a second expression vector which directs the expression of a promiscuous G-protein, resulting in test cells;

25 (b) exposing the test cells to a substance that is an agonist of HG51;

(c) subsequently or concurrently to step (b), exposing the test cells to a substance that is a suspected antagonist of HG51;

(d) measuring the level of inositol phosphates in the cells; where a decrease in the level of inositol phosphates in the cells in the presence of the suspected antagonist as compared to the level of inositol phosphates in the cells in the absence of the suspected antagonist indicates that the substance is an antagonist of HG51.

32. A method of identifying antagonists of HG51 as recited in claim 31 wherein the first and second expression vectors of step (a) are replaced with a single expression vector which expresses a chimeric HG51 protein fused at its C-terminus to a promiscuous G-protein.

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33. An antibody that binds specifically to HG51 protein wherein the HG51 receptor protein comprises the amino acid sequence as set forth in SEQ ID NO:2.